

# *The Irrelevance of the Diachronic Money-Pump Argument for Acyclicity\**

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**ABSTRACT.** The money-pump argument is the standard argument for the acyclicity of rational preferences. The argument purports to show that agents with cyclic preferences are in some possible situations forced to act against their preference. In the usual, diachronic version of the money-pump argument, such agents accept a series of trades that leaves them worse off than before. Two stock objections are (i) that one may get the drift and refuse the trades and (ii) that one may adopt a plan to only accept some of the trades. This article argues that these objections are irrelevant. If the diachronic money-pump argument is cogent, so is a more direct synchronic argument. The upshot is that the standard objections to the diachronic money-pump argument do not affect this simpler synchronic argument. Hence the standard objections to the money-pump argument for acyclicity are irrelevant.

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The first occurrence of the money-pump argument in print is due to

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Donald Davidson, J. C. C. McKinsey, and Patrick Suppes.<sup>1</sup> It is part of a demonstration of the irrationality of a Mr. S who considers three different jobs:

$a$  = full professor with a salary of \$5,000,

$b$  = associate professor at \$5,500,

$c$  = assistant professor at \$6,000.

Mr. S prefers  $a$  to  $b$ ,  $b$  to  $c$ , and  $c$  to  $a$ . Davidson et al. object that these cyclic preferences rule out a rational choice according to *the non-dominated choice principle*, which says that

a rational choice is one which selects an alternative to which none is preferred.<sup>2</sup>

To illustrate this principle, Davidson et al. introduce their money-pump example.

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We may imagine a scene in which the point becomes obvious. The department head, advised of Mr. S's preferences, says, 'I see you prefer  $b$  to  $c$ , so I will let you have the associate professorship—for a small consideration. The difference must be worth something to you.' Mr. S. agrees to slip the department head \$25. to get the preferred alternative. Now the department head says, 'Since you prefer  $a$  to  $b$ , I'm prepared—if you will pay me a little for my trouble—to let you have the full professorship.' Mr. S. hands over another \$25. and starts to walk away, well satisfied, we may suppose. 'Hold on,' says the department head, 'I just realized you'd rather have  $c$  than  $a$ . And I can arrange that—provided...'<sup>3</sup>

Frederic Schick has levelled an influential objection to the money-pump argument. He argues as follows:

Again, the agent prefers [ $a$  to  $b$ ,  $b$  to  $c$ , and  $c$  to  $a$ ]. This much remains fixed. It does not follow that the values he sets on the arrangements he is offered are all positive. In the absence of special information, he sets a positive value on the pumper's canceling  $X$  in favor of some preferred outcome  $Y$ —this for all  $X$  and  $Y$ . But

<sup>1</sup> Donald Davidson, J. C. C. McKinsey, and Patrick Suppes, "Outlines of a Formal Theory of Value, I," *Philosophy of Science*, xxii, 2 (April 1955): 140–160.

<sup>2</sup> Davidson et al., *op. cit.*, p. 145.

<sup>3</sup> Davidson et al., *op. cit.*, p. 146.

where he has made certain arrangements already and now looks back, he may get the drift. He may see he is being pumped and refuse to pay for any further deals. His values would then be different. He would set a *zero* value on any new arrangement.<sup>4</sup>

Schick's point seems to be that the agent may prefer *c* to *a* while also preferring

*a* after having swapped *c* for *b* and then *b* for *a*

to

*c* after having swapped *c* for *b*, *b* for *a*, and then *a* for *c*.

So, even though the agent prefers *c* to *a*, he need not prefer swapping from *a* to *c* after having swapped from *c* to *b* and then from *b* to *a*. As we could put it, the alternatives need not be preference-wise independent.<sup>5</sup> Thus one may have cyclic preferences and still turn down the second or third swap in the money pump.

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A similar objection is due to Edward F. McClennen. He proposes that one may avoid being money pumped by becoming a resolute chooser. A resolute chooser is someone who

proceeds, against the background of his decision to adopt a particular plan, to do what the plan calls upon him to do, even though it is true (and he knows it to be true) that were he not committed to choosing in accordance with that plan, he would now be disposed to do something quite distinct from what the plan calls upon him to do.<sup>6</sup>

If one does not confront each new decision myopically but instead adopts and sticks to a plan, one might avoid being money pumped. For example, Mr. S might adopt the plan to accept the swap from *c* to *b* and also the one from *b* to *a* and then refuse any further trades.<sup>7</sup> Hence Mr. S could avoid being money pumped.

<sup>4</sup> Frederic Schick, "Dutch Bookies and Money Pumps," *The Journal of Philosophy*, LXXXIII, 2 (February 1986): 112–119, p. 118.

<sup>5</sup> Schick, *ibid.*, writes 'value-wise independent' but this is confusing since we are dealing with preferences, not values nor value judgements.

<sup>6</sup> Edward F. McClennen, *Rationality and Dynamic Choice: Foundational Explorations* (New York, Cambridge, 1990), p. 13. See also Robert Nozick, *The Nature of Rationality* (Princeton, N.J., University Press, 1993), p. 140n.

<sup>7</sup> McClennen, *op. cit.*, p. 166.

Before we reply to these objections, we need to differentiate between two views on what is supposed to be irrational about the agent who goes along with a money pump. Schick takes a premise of the money-pump argument to be that it is irrational to be exploited. He writes about jointly exploitable dispositions, “My point has been only that their being exploitable does not reveal any fault in them.”<sup>8</sup> But on my view it is not being exploitable by itself that is irrational. What is irrational about being money pumped is that one chooses against one’s preference, for example, choosing  $c$  with a loss of money over  $c$  without a loss of money when you prefer  $c$  without a loss of money to  $c$  with a loss of money. Whether someone else thereby gets rich at your expense is irrelevant for whether you are rational. If you do not mind being exploited, the classical decision theorist may grant your letting yourself be exploited as rational.

Note that there is no talk of exploitability in the original presentation of the money-pump argument by Davidson et al. Their point does not seem to be that Mr. S is irrational because he is exploited by the department head. Their money-pump example is supposed to illustrate the non-dominated choice principle, which yields that it is irrational to choose an alternative to which another alternative is preferred. It is that Mr. S is unsatisfied whatever he chooses that is supposed to be irrational; a result of this is that whatever he chooses, he is willing to pay in order to revoke his decision in favour of another alternative.

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Since it is not exploitability but choosing against one’s preference that is taken to be irrational, the sequential part of the argument is unnecessary. The department head could offer Mr. S a single choice between all three of  $a$ ,  $b$ , and  $c$ . This will not make Mr. S poor nor the department head rich, but it will force Mr. S to choose an alternative over which another is preferred, which the non-dominated choice principle rules out as irrational. Since Mr. S this time just makes a single choice between the alternatives individually, it does not matter whether the alternatives are preference-wise independent. Thus Schick’s worry that the agent may get the drift and prefer the alternatives differently depending on earlier arrangements is no longer relevant. Furthermore, in reply to McClennen, since Mr. S in this variation only makes one choice, any plans are irrelevant.

Here one might object that we may, following Kenneth J. Arrow, take preferences to just restrict a choice function to sets of alternatives con-

<sup>8</sup> Schick, *op. cit.*, p. 118.

taining at most two elements.<sup>9</sup> Given this, Mr. S does not have a well-defined (or unique) choice function; there is no information regarding what would happen if he were faced with a choice from the set of alternatives  $\{a, b, c\}$ . Hence any argument, like the one above, that is based on what Mr. S would choose from  $\{a, b, c\}$  is void.

This objection, however, assumes that we must know what would happen if Mr. S were faced with a choice from  $\{a, b, c\}$ . But we only need to know that he would choose something, and that part is easy—we can just stipulate that the situation is such that the agent is forced to choose an alternative. The point is that we do not need to know which of  $a$ ,  $b$ , and  $c$  Mr. S would choose, since he would violate the non-dominated choice principle whichever he chooses.

One might also object that to be ruined by exploitation is more worrying than just acting against one's preference. Thus some of the punch of the diachronic money-pump argument is lost in the synchronic one.<sup>10</sup> But even though the prospect of losing all one's money makes the argument more dramatic, what is supposed to be irrational about losing all one's money? It just seems irrational since most people prefer not to be ruined, and thus to choose to be ruined when given the choice is typically to choose against one's preference. Hence the synchronic version of the argument should be equally worrying, since it involves the same type of irrationality.

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One might further object, however, that the non-dominated choice principle is susceptible to counter-examples where the set of alternatives contains infinitely many members and hence that the synchronic money pump is unconvincing. Robert Nozick writes:

For example, suppose the person prefers  $a$  to  $b$  and the set of alternatives consists of those alternatives giving a probability  $p$  of  $a$  and  $(1 - p)$  of  $b$ , for all  $p$ ,  $0 < p < 1$ . If the person prefers a chance  $p$  of  $a$  and  $(1 - p)$  of  $b$  to a chance  $q$  of  $a$  and  $(1 - q)$  of  $b$  iff  $p > q$ , then there will be no member of this set of alternatives such that

<sup>9</sup> Kenneth J. Arrow, "Rational Choice Functions and Orderings," *Economica*, xxvi, 102, (May 1959): 121–127, p. 122.

<sup>10</sup> For example, Stuart Rachels's response to the money-pump argument is that rational persons reject the principle *it is always wise to give up something to get something better* and thereby avoid being exploited into poverty. Thus he seems to think that exploitation is more worrying than violating the non-dominated choice principle. See Stuart Rachels, "Counterexamples to the Transitivity of Better Than," *Australasian Journal of Philosophy*, lxxvi, 1, (March 1998): 71–83, p. 82.

no other member of the set is preferred to it.<sup>11</sup>

In this case, the agent's preferences seem rational, yet the non-dominated choice principle yields that the agent still cannot make a rational choice. A first response could be to weaken the non-dominated choice principle so that it only says that rational choices from finite sets of alternatives are not dominated. A second response could be to accept that there need not be a rational choice in cases where the set of alternatives is infinite even though the agent's preferences are rational. Both of these replies, however, might seem ad hoc. Nevertheless, this is not crucial to the argument of this paper, since the diachronic money-pump argument needs some similarly vulnerable variant of the non-dominated choice principle in order to explain why losing money is irrational. Hence insofar as infinite sets of alternatives invalidate the synchronic money-pump argument, they also invalidate the diachronic argument. Thus Nozick's example does not affect my claim that if the diachronic money-pump argument is cogent, so is the synchronic argument. Wherefore, it does not vindicate the relevance of the standard objections that only apply to the diachronic version of the money-pump argument.<sup>12</sup>

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<sup>11</sup> Robert Nozick, *The Normative Theory of Individual Choice*, (Ph.D. dissertation, Princeton, 1963), p. 89.

<sup>12</sup> To avoid a possible misunderstanding, a reminder about the scope of my claims: My argument only concerns the money-pump argument for acyclicity. If one wants to support other rationality constraints with a money-pump argument, such as independence of irrelevant alternatives, a synchronic money pump might perhaps not suffice. Still, the synchronic approach can be extended to also support that rational preferences are transitive with the method described in Johan E. Gustafsson, "A Money-Pump for Acyclic Intransitive Preferences," *Dialectica*, LXIV, 2 (June 2010): 251–257, pp. 255–256.